

Sustainable Seas Expeditions

Florida Keys National Marine Sanctuary
P.O. Box 1083
Key Largo, FL. 33037
305-852-7717 ext.35

July 26, 1999

Draft Cruise Instructions

NOAA Ship: Ferrel

Cruise Number: FE-99-15-FK

Cruise Title: Sustainable Seas Expeditions

Study Area: Florida Keys National Marine Sanctuary

Sponsoring Institution: NOAA's National Ocean Service (NOS), Sustainable Seas Expedition (SSE), National Geographic Society (NGS)

Cruise Description and Objectives: The objectives of this cruise in the Florida Keys National Marine Sanctuary are to enhance public awareness of the Sanctuary's role in resource protection, to explore and characterize the deep coral reef environment, particularly in the proposed Ecological Reserve to the west of the Tortugas, to scientifically monitor deep coral reef health, and to obtain baseline monitoring data on selected artificial reef sites. The Sanctuary also hopes that media events surrounding the expedition will highlight both nationally and internationally the significance and value of sustaining healthy coral reefs and the resource management challenges which the Sanctuary faces. Two of the dives will be devoted to collaborative education proposals created by high school students from two of the local high schools. Two of the dives will be devoted to a Reef Environmental Education Foundation fish count.

Synopsis of Scientific Measurements: The scientists will record digital video imagery and still photography along pre-determined transects using the submersibles. Linear measurement data using lasers will also be collected with the submersibles. Limited geological sampling will be attempted during this first season using the manipulator arm.

Chief Scientist: Dr. Sylvia Earle

1.0 ORGANIZATIONAL STRUCTURE

1.1 STRUCTURE

- *Commanding Officer* - CDR. Paul Moen - Final approval authority for all operations, including (in conjunction with the Dive Supervisor) the decision to launch the sub.
- *Chief Scientist* - Dr. Sylvia Earle or Francesca Cava
- *Mission Coordinator /Sanctuary Manager*- LCDR. Dave Savage - responsible for daily mission dive plan and maintaining communications with Principal Investigators and Chief Scientist. As Sanctuary Manager is responsible for ensuring that no harm is done to the resource during the course of the mission.

- *Dive Supervisor* - Larry Shoemaker - Responsible for the procedures and coordination of all dive operations, makes final decision in conjunction with the Commanding Officer to launch the sub.
- *Principal Investigator* - Dr. Sylvia Earle, Dr. Pamela Hallock Muller, Dr. Erich Mueller, Ben Haskell, Dr. John Ogden, Dr. Phil Dustan, Mary Tagliareni, and Laddie Akins - Responsible for the individual project content.
- *Pilots* - Laddie Akins, Francesca Cava, Dr. Phil Dustan, Dr. Sylvia Earle, Walt Jaap, Dr. Erich Mueller, Dave Savage, Mary Tagliareni, Dr. John Ogden - Certified DeepWorker pilot approved for the specific mission dive.
- *Mission Log Coordinator* - Gale Meade, Mary Tagliareni - Responsible for compiling the Mission Log for the SSE Web site.
- *Photographer/Videographer* - Kip Evans - Responsible for all photographic equipment and imagery collected on the Deepworker 2000.

1.2 PROTOCOL

Dive Authority - The Commanding Officer and the Dive Supervisor will make the final decision on dive operations.

2.0 OVERVIEW OF OPERATIONS

The 1999 SSE Expeditions in the Florida Keys National Marine Sanctuary involve researchers from the Mote Marine Laboratory, the University of South Florida, the University of Charleston, the Reef Environmental Education Foundation, Florida Marine Research Institute, the Florida Institute of Oceanography and the Florida Keys National Marine Sanctuary. The cruise is scheduled to begin on August 15 and end August 28. The region to the west of the Dry Tortugas will be investigated first after the *Ferrel* departs from Key West. Once the initial work is completed in the Tortugas, the ship will make a port call in Key West for an open house and to take on supplies. The ship will then complete the Tortugas projects and make its way up the reef tract to the northeast for the deep reef monitoring, artificial reef monitoring, education, and fish count projects. The *Ferrel* will complete the second leg in Key West.

3.0 ITINERARY

AUGUST

- 12 Ferrel arrives at USCG Pier Key West
- 13 Alongside USCG pier Key West
- 14 Load submersibles and scientific equipment on ship

LEG I

15 VIP TRAINING

- 0800 - Underway from Key West USCG Pier to Sand Key SPA for VIP Dives with Terry Garcia, Sally Yozell, and two National Geographic VIPs
- 1600 - return VIPs to Key West
- 2200- Ferrel departs for Tortugas Bank for anchorage

0500 - Ferrel anchors on Tortugas Bank

16 TORTUGAS BANK DIVES

0745 - passenger transfer from Dante Fascell RHIB to Ferrel on Tortugas Bank
0800 - Ferrel on site Tortugas Bank
0830-1130 - Exploratory dive - Tortugas Bank - Sylvia Earle
1230-1530 Tortugas Bank project dive - Walt Jaap
1530-1600 - transit to Sherwood Forest
1600 - transfer passengers to Dante Fascell RHIB and anchor near Sherwood Forest
weather contingency for Ferrel - sediment sampling - Pam Hallock-Muller
Dante Fascell ops. - sediment sampling

17 SHERWOOD FOREST/BLACK CORAL ROCKS & MEDIA DAY FOR LEG I

0745 - passenger transfer from Dante Fascell RHIB to Ferrel at Sherwood Forest
0800 - on site at Sherwood Forest
0830-1130 Exploratory dive - Sherwood Forest - Sylvia Earle
1230-1530 Tortugas project dive - Black Coral Rocks - Walt Jaap
1600 - passenger transfer to Dante Fascell RHIB and anchor near Riley's Hump
weather contingency for Ferrel - sediment sampling - Pam Hallock-Muller
Dante Fascell ops. - sediment sampling

18 RILEY'S HUMP/EIGHT FATHOM ROCKS DIVES

0745 - passenger transfer from Dante Fascell RHIB to Ferrel at Riley's Hump
0800 - on site at Riley's Hump
0830-1130- Exploratory dive - Riley's Hump - Sylvia Earle
1230-1530- photo dive Kip Evans - Eight Fathom Rocks
1600 - passenger transfer to Dante Fascell RHIB and anchor near Riley's Hump
weather contingency for Ferrel- sediment sampling - Pam Hallock-Muller
Dante Fascell ops. - sediment sampling

19 RILEY'S HUMP DIVES

0745 - passenger transfer from Dante Fascell RHIB to Ferrel at Riley's Hump
0800 - on site Riley's Hump
0830-1130 - Riley's Hump Dive - Walt Jaap
1230-1530 - Riley's Hump Dive- Erich Mueller
1600 - passenger transfer to Dante Fascell RHIB and anchor near Sherwood Forest
weather contingency for Ferrel - CTD ops.

20 SHERWOOD FOREST DIVES & LIVE NASA UPLINK

0745 - passenger transfer from Dante Fascell RHIB to Ferrel at Riley's Hump
0800 - on site Riley's Hump
0830-1130 - REEF project dive -Sherwood Forrest- Laddie Akins
1230-1530 - Tortugas project dive - Sherwood Forest - Erich Mueller
1300-1400 NASA live video uplink on Dante Fascell, contingency for uplink -
Loggerhead
1600 - passenger transfer to Dante Fascell RHIB and anchor on Tortugas Bank
weather contingency - CTD ops.

21 TORTUGAS BANK DIVE

0745 - passenger transfer from Dante Fascell RHIB to Ferrel at Tortugas Bank
0800 - on site Tortugas Bank
0830-1130 - Tortugas project dive - Erich Mueller, PM Port Call Key West
1130-1830 - transit to USCG Pier Key West

22 OPEN HOUSE

0900 - shift from Trumbo Point USCG to Mallory Square
1100-1500 Open House - Mallory Square
1500 - shift to Trumbo Point USCG Pier

LEG II

23 CHECKOUT DIVES & TRANSIT TO CARYSFORT

0800 - Depart Key West for Looe Key
1100-1400 - Checkout Dives Looe Key vicinity for Dustan, Savage, Tagliareni
1400 - transfer passenger Brill to Cool Hand - to Port Largo
1400 - 2100 - transit to Carysfort
weather contingency - ROV ops. Wilkes Barre

24 CARYSFORT DIVES, FKNMS STAFF DAY, TEACHERS, AND STUDENTS

0745 - transfer passenger Brill to Ferrel from Cool Hand
0800 - On site at Carysfort Hump
0830 - 1130 - project dive - Carysfort Hump - Dave Savage
1230 - 1530 - project dive - Carysfort - Phil Dustan
1600 - transfer passenger Brill to Cool Hand and anchor near Carysfort

25 CARYSFORT DIVES

0730 - transfer passengers Aikins and Brill to Ferrel from Cool Hand
0745 - on site Carysfort
0800 - 1030 - project dive - Carysfort - Phil Dustan
1130 - 1400 - project dive - Carysfort - Phil Dustan
1500 - 1730 - REEF project dive - Carysfort - Aikins
1730 - transfer passenger Ogden from Cool Hand and passengers Dustan, Aikins, and Brill to Cool Hand - back to Port Largo
1730 -1830 - transit to Molasses for anchorage

26 MOLASSES/CONCH DIVES AND MEDIA DAY FOR LEG II

0800 - on site Molasses
0830-1130 - sponge monitoring dive - Molasses - John Ogden
1130 - 1200 - transit to Conch ROA
1230 - 1530 - education dive - Conch - Mary Tagliareni
1530 - 2230 - transit to Eastern Sambo ROA anchorage

27 SAMBOS DIVES, TEACHER AND STUDENT DAY

0745 - passenger transfer

0800 - on site Eastern Sambo ROA
0830 - 1130 - project dive - Eastern Sambo - John Ogden
1230 - 1530 - education dive - Western Sambos - Mary Tagliareni

- transit to Key West to arrive by 1800

4.0 CONTACT PERSONNEL

Scientific Operations:

Florida Keys National Marine Sanctuary
Ben Haskell
P.O. Box 500368
Marathon, FL. 33050
305-743-2437 ext. 25

Chief Scientist
Dr. Sylvia Earle
735 State St., Suite 305
Santa Barbara, CA. 93101
805-963-3238

Ship Operations:

NOAA Pacific Marine Center
LT Dana Wilkes
1801 Fairview Ave. E.
Seattle, WA 98102
206-553-4548 206-553-1109 (Fax)

5.0 PROJECT DESCRIPTIONS

5.1 PROJECT DIVES

Project Dive #1

Principal Investigator: Sylvia Earle

Objective: to explore the deep reefs surrounding the west bank of the Tortugas to characterize the proposed Tortugas Ecological Reserve.

Task: To make observations and to collect imagery.

Pilot: Sylvia Earle

Dive 1: Location - west bank of the Tortugas, Maximum depth - 180', Duration - 2.5 hours, Contingency dive: shallow dive leeward of Loggerhead Key - Loggerhead Forest, Maximum depth - 96', Duration - 2.5 hours

Dive 2: Location - Sherwood forest, Maximum depth - 102', Duration - 2.5 hours
Contingency dive: shallow dive leeward of Loggerhead Key - Loggerhead Forest, Maximum depth - 96', Duration - 2.5 hours

Dive 3: Location - Riley's Hump, Maximum depth - 180', Duration - 2.5 hours
Contingency dive: shallow dive leeward of Loggerhead Key in DTNP- Loggerhead Forest, Maximum depth - 60', Duration - 2.5 hours

Equipment Sub: No special equipment required on the submersible

Equipment Ship: No special equipment required on the ship

Project Dive #2

Principal Investigator: Pamela Hallock Muller

Objective: to characterize biologically and geologically the Tortugas Banks and adjacent areas.

Task: To make observations, collect imagery, and take limited substrate samples.
To collect CTD data from the ship.

Pilot: Walt Jaap

Dive 1: Location - west of Tortugas (24°-38'N, 83°-04'N), Maximum depth - 180', Duration - 2.5 hours

Dive 2: Location - Black Coral Rocks (24°-41.9616'N, 83°-00.1503'N), Maximum depth - 180', Duration - 2.5 hours

Dive 3: Location - Sherwood Forest night dive (24°-38'N, 83°-04'N), Maximum depth - 180', Duration - 2.5 hours

Dive 4: Location - Riley's Hump, (24°-30'N, 80°-07'W)?, Maximum depth - 180', Duration - 2.5 hours

Contingency dive: Location - Loggerhead Forest DTNP, Maximum depth - 96', Duration 2.5 hours

Equipment Sub: No special equipment required on the submersible

Equipment Ship: CTD, side-scan sonar, bottom cores, and nitrox tanks required on the ship

Project Dive #3

Principal Investigator: Erich Mueller

Objective: To determine the influence of Gulf of Mexico water on the deep reef tract near the Tortugas. To make observations and collect imagery. To collect CTD data from the ship.

Pilot: Erich Mueller

Dive 1: Location - West Bank of the Tortugas (24°-38'N, 83°-04'W), Maximum Depth - 180', Duration - 2.5 hours

Dive 2: Location - West Bank of the Tortugas (24°-38'N, 83°-04'W), Maximum Depth - 180', Duration - 2.5 hours

Dive 3: Location - West Bank of the Tortugas (24°-38'N, 83°-04'W), Maximum Depth - 180', Duration - 2.5 hours

Dive 4: Location - West Bank of the Tortugas (24°-38'N, 83°-04'W), Maximum Depth - 180', Duration - 2.5 hours

Contingency Dive: Location - Leeward side of Loggerhead Key, Loggerhead Forest DTNP, Maximum Depth - 96', Duration - 2.5 hours

Equipment Sub: No special equipment required on the submersible

Equipment Ship: CTD and Nitrox equipment required on the ship

Project Dive #4

Principal Investigator: Mary Tagliareni

Objective: To carry out two education proposals created by local high school students. These proposals will include broad based ecosystem exploration from the shallower communities to the deep reef environment.

Task: To collect imagery and make observations along transects from the fore reef environment to the deep reef environment.

Pilot: Mary Tagliareni

Dive 1: Location - Conch ROA , Maximum Depth - 300', Duration - 2.5 hours
Dive 2: Location - Western Sambo ER, Maximum Depth - 300', Duration - 2.5 hours
Contingency Dive: Location - Carysfort Reef, Maximum Depth - 300', Duration - 2.5 hours
Equipment Sub: No special equipment required on the submersible
Equipment Ship: No special equipment required on the ship

Project Dive #5

Principal Investigator: Laddie Akins

Objective: To perform a REEF (Reef Environmental Education Foundation) fish survey in the deep reef environment.

Task: Collect digital video imagery, still photos, and real time fish count data.

Pilot: Laddie Akins

Dive 1: Location - Sherwood Forest, Maximum Depth - 180', Duration - 2.5 hours
Contingency Dive: Location - Loggerhead Forest DTNP, Duration - 2.5 hours
Equipment Sub: No special equipment required on the submersible
Equipment Ship: No special equipment required on the ship

Dive 2: Location - Carysfort, Maximum Depth - 200', Duration - 2.5 hours
Contingency Dive: Location - the Elbow, Maximum Depth - 200', Duration - 2.5 hours
Equipment Sub: No special equipment required on the submersible
Equipment Ship: No special equipment required on the ship

Project Dive #6 - ALL OF THESE ROV DIVES ARE WEATHER CONTINGENCY DIVES

Principal Investigator: Ben Haskell

Objective: To explore and document biota and cultural data on two deep artificial reefs.

Task: To collect digital video and still photo imagery and to collect small mollusc samples.

Pilot: N/A

Dive 1 (ROV): Location - U.S.S. Wilkes Barre (Key West 24°-27.94'N, 81°-32.34'W), Maximum Depth - 275', Duration - 2 hours
Dive 2 (ROV): Location - Ocean Freeze (Pacific Reef 25°-23.086'N, 80°-07.098'W), Maximum Depth - 240', Duration - 2 hours

Project Dive #7

Principal Investigator: John Ogden

Objective: To explore and document sponge health in the deep reef environment.
Task: To collect digital video and still photo imagery to quantify deep sponge community health.

Pilots: John Ogden

Dive 1: Location - Molasses Reef, Maximum Depth - 200', Duration - 2.5 hours
Dive 2: Location - Eastern Sambos ROA reef, Maximum Depth - 200', Duration - 2.5 hours

Project Dive #8

Principal Investigator: Phil Dustan

Objective: To explore and document deep reef health.

Task: To collect digital video and still photo imagery to quantify deep reef coral health.

Pilot: Phil Dustan/Dave Savage

Dive 1: Location - Carysfort Reef, Maximum Depth - 200', Duration - 2.5 hours
Dive 2: Location - Carysfort Reef, Maximum Depth - 200', Duration - 2.5 hours
Dive 3: Location - Carysfort Reef, Maximum Depth - 200', Duration - 2.5 hours
Dive 4: Location - Carysfort Reef, Maximum Depth - 200', Duration - 2.5 hours

Contingency Dive: Location - Elbow Reef, Maximum Depth - 200', Duration - 2.5 hours

Equipment Sub: No special equipment required on the submersible

Equipment Ship: No special equipment required on the ship

5.2 OTHER PROJECTS

Event Name: Shipboard Open House in Key West, Mallory Square

Purpose: To make SSE submersible information and technology accessible to the general public.

Date and time: Sunday, August 22, 11:00 A.M. - 3:00 P.M. USCG Pier, Key West, FL.

Alternative Date and Time: Saturday, August 21, 11:00 A.M. - 3:00 P.M., USCG Pier, Key West, FL

5.3 ADDITIONAL PROJECTS

Project Title: Molluscan Biodiversity

Principal Investigator: Paula Mikkelsen

Objective: To identify new species of molluscs on the deep reefs of the Florida Keys.

Task: To collect and identify/classify mollusc samples using the submersible.

Location: Conch Reef and Carysfort Reef.

Alternate site: The Elbow

Equipment Ship: None Required

Equipment Scientific Party: Sampling jars and preservative.

6.0 OPERATIONAL PLANS

The following operational plans can only be considered a guide as to how the Chief Scientist expects the project to progress without being able to predict the weather, operational and scheduling problems, and equipment failures. Appendix A will list geographical positions of transects, sites, and stations.

6.1 SSE PROJECTS

Biological and Geological Characterization of the Tortugas Banks Area: The operational plan for this project is to explore topographically complex areas which were defined by University of South Florida side-scan sonar data. The submersible will be used to photograph and video data which will be used to interpret biotic communities and geologic processes on the Tortugas Banks. Sites will be identified during this exploration phase for future monitoring. One night dive is planned during the project to evaluate diurnal patterns in the abundance of benthic organisms. The shallower sites will also be explored by divers using nitrox.

Influence of the Gulf of Mexico Waters on Benthic Resources of the Florida Keys National Marine Sanctuary: The operational plan for this project is to establish and monitor deep transects using digital video imagery. These transects will be in the vicinity of the Tortugas and will examine a variety of coral reef health parameters such as benthic cover, diseases and bleaching. Nitrox dives will supplement the submersible dives in the shallower areas.

The Fate of Artificial Reefs and Their Long-Term Ecological Effects: The operational plan for this project is to gather digital video data on two deeper artificial reefs using the ROV. The artificial reefs are ship hulls which were intentionally sunk in Sanctuary waters. Data will be gathered on the disposition of the hull, sediment toxicity (from the ship), fish abundance and diversity, fish spawning aggregations, and benthic invertebrate diversity and abundance. The long-term monitoring of the Ocean Freeze and the Wilkes Barre will help to evaluate artificial reefs as a management tool to help alleviate pressure on the natural reefs and to offer alternative fishing sites.

REEF Fish Count: Two submersible dives will be devoted to a Reef Environmental Education Foundation fish count in the deep reef environment. Traditional REEF surveys will be performed by the pilot. This survey data will be supplemented with digital video data which is collected by the submersible. The Sherwood Forest and Carysfort areas will be targeted for this survey.

Monitoring and Vitality Assessment of Deep Reef Coral Populations of the Florida Keys National Marine Sanctuary: The submersible operations will be a follow-up of a submersible survey conducted in 1979 which described a reef system in 30-50 meters offshore from Carysfort Reef and the Elbow. Little is known about the current condition of these reefs. The health and status trends of shallow Florida Keys reefs have been well documented through the USEPA Coral Reef Monitoring Project. The results from these rarely seen deep reef locations will provide additional insight into the health and status and trends of the Florida Keys reefs and will help address questions regarding the sources of stress factors in offshore versus onshore areas. The digital video transects visited with the submersible will also help contribute to the basic knowledge concerning the extent of reef corals in the Florida Keys. The video collected using the submersible will be used to make observations on the species and health of deep reef corals. The submersible will also be used to establish deep water transects by deploying transect markers which can be revisited in the future.

The ancillary project of molluscan biodiversity will be supported on two of these submersible dives. Molluscs will be collected on the artificial reefs using the manipulator arm and a small collecting basket. They will then be preserved for identification in the laboratory.

6.2 ADDITIONAL PROJECTS

Molluscan biodiversity and taxonomy will be added to the deep reef monitoring project as an additional or ancillary project. Molluscs collection will be attempted on the deep reefs using the submersible's manipulator arm. The collected molluscs will be placed in a collection basket and be brought to the surface to be preserved for later identification. Little is known about molluscs in the deeper offshore areas of the Florida Keys.

7.0 SCIENTIFIC PERSONNEL

7.1 The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship (2) exceed the time allotted for the cruise (3) result in undue additional expense or (4) change the general intent of the project.

7.2 PARTICIPATING SCIENTISTS

NAME	Gender/Nationality	Project	Organization	Date (on Ferrel)
Pamela Hallock Muller	F/USA	Tortugas Banks	USF	8/15-8/18
Walter C. Jaap	M/USA	Tortugas Banks	FMRI	8/15-8/18
Jennifer Wheaton	F/USA	Tortugas Banks	FDEP	N/A
Matt Patterson	M/USA	Tortugas Banks	FDEP	N/A
David Eaken	M/USA	Tortugas Banks	FDEP	N/A
John Dotton	M/USA	Tortugas Banks	FDEP	N/A
Matt Lyboltt	M/USA	Tortugas Banks	FDEP	N/A
Tom Trice	M/USA	Tortugas Banks	FDEP	N/A
Albert C. Hine	M/USA	Tortugas Banks	USF	N/A
David Mallinson	M/USA	Tortugas Banks	USF	N/A
Erich Mueller	M/USA	Gulf of Mexico	Mote	8/19-8/21

Gene Hawkrigde	F/UK	Gulf of Mexico	Mote	N/A
Mary Tagliareni	F/USA	Education	FKNMS	8/19-8/27
Ben Haskell	M/USA	Artificial Reefs	FKNMS	N/A
Dave Savage	M/USA	Artificial Reefs	FKNMS	8/15-8/27
Laddie Akins	M/USA	Fish Survey	REEF	N/A
John Ogden	M/USA	Deep Sponge Mon.	FIO	8/25-8/27
Phil Dustan	M/USA	Deep Reef Mon.	UC	8/23-8/24
Mike Brill	M/USA	Deep Reef Mon.	UC	N/A

7.3 PARTICIPATING TECHNICIANS

NAME	Gender/Nationality	Project	Organization	Date
Greg Deangelo	M/USA	All	FKNMS	N/A

7.4 OTHER PERSONNEL

NAME	Gender/Nationality	Project	Organization	Date
Steve Baumgartner	M/USA	Operations	FKNMS	N/A
Bruce Reyngoudt	M/USA	Shuttle Ops.	FKNMS	N/A
Bill Valley	M/USA	Operations	FKNMS	N/A

MEDICAL FORMS

All personnel participating on board will complete a NOAA health Services Questionnaire prior to embarking on the vessel. Forms will be completed and submitted to the Commanding Officer per NOAA Corps Instruction 6000.

8.0 DATA RESPONSIBILITIES

8.1 DATA AND SAMPLES

8.1.1 The Chief Scientist is responsible for the data quality, disposition, and archiving of data and samples collected aboard the ship for the primary project. As the representative of the cruise sponsor, the Chief Scientist is also responsible for the dissemination of copies of these data to participants on the cruise and to any other requesters.

8.1.2 The Commanding Officer will give the acting Chief Scientist a single copy of all data collected by ship's personnel. The ship's Scientific Computer System (SCS) will collect data continuously during the project. The SCS data will be provided to the Chief Scientist at the completion of the project. The Chief Scientist will provide the Commanding Officer a list of all data collected by the scientific party.

8.1.3 The Commanding Officer is responsible for all data collected for ancillary projects until those data have been transferred to the projects Principal Investigator.

8.2 RECORDS AND REPORTS

8.2.1 Marine Operations Abstract (MOA). FERREL'S officers will maintain the MOA during the cruise. The ship's position will be entered for all operations, and otherwise every 30 minutes or when changing course or speed. The Commanding Officer will give the Mission Coordinator a copy of the MOA at the completion of the project.

8.2.2 Pre-dive forms will be used to check out the sub prior to each dive and are the responsibility of the pilot and dive crew. Pre-dive forms will be signed by the Dive Supervisor.

8.2.3 Dive Logs will be used to keep track of the sub's performance during each dive and are the responsibility of the Dive Supervisor or designee.

8.2.4 The Mission Coordinator Log will provide an accounting of the project work being conducted during each dive and are the responsibility of the Mission Coordinator.

8.2.5 The Mission Log will be based on a compilation of materials collected during dive operations (audio, video, photographs) and information collected post-dive (text provided by pilots), and will be posted on the NGS SSE Web site. The Mission Log is the responsibility of the Mission Log Coordinator.

8.2.6 The Mission Coordinator will complete the Ship's Operations Evaluation Form and forward to the Office of NOAA Corps Operations.

8.2.7 All film collected during the cruise will be handled in accordance with the MOU between NOAA and NGS.

9.0 EQUIPMENT LISTS

9.1 SUPPLIED BY THE SCIENTIFIC PARTY:

(A) Forthcoming

9.2 SUPPLIED BY THE FERREL:

(A) CTD

9.3 SUPPLIED BY SSE:

(A) ROV

9.4 SUPPLIED BY USF:

(A) Bottom Grabs

10.0 ADDITIONAL AND ANCILLARY PROJECTS

10.1 **ADDITIONAL PROJECTS:** Any other work done during the cruise period will be subordinate to the main project and performed so as to not interfere with that outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the main project.

10.1.1 These are projects related to the cruise, but not to SSE. Such projects are to be conducted at night or during extended down times of the SSE

Examples include side-scan sonar or net tow operations. See section 5.3 for information on additional projects.

10.2 ANCILLARY PROJECTS: Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force.

10.2.1 Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions.

11.0 MISCELLANEOUS

11.1 Navigation Control: Shipboard DGPS provided for vessel, Submersible navigation provided by NUYTCO.

11.2 Required Compliance: The Chief Scientist will require each Mission Coordinator to contact local authorities to increase the safety and awareness of the operations. These authorities include:

11.2.1 The US Coast Guard Station responsible for the area of coverage in these cruise instructions is Coast Guard Station Key West.

11.2.2 Local Notice to Mariners in the district concerning the area covered in the cruise instructions.

11.2.3 Port Authority or Harbor master for potential dive sites.

12.0 COMMUNICATIONS

12.1 FERREL will communicate daily, Monday through Friday, with the Atlantic Marine Center. Normally this will be via message, but radio contact will be maintained when possible.

12.2 Because the scientific staff must sometimes communicate with other research vessels, commercial vessels, and shore-based NOAA facilities, the Chief Scientist or his designee may request the use of radio transceivers aboard the vessel. The scientific party, Sanctuary staff, and FERREL personnel will also have access to a long-range VHF system owned by the Sanctuary which allows for communications between the Dry Tortugas and locations as far away as Marathon. The system has 18 mobile units which may be deployed ashore and in support vessels.

12.3 FERREL is equipped with INMARSAT and cellular telephone. The Chief Scientist may need access to these systems with permission from the Commanding Officer. The Commanding Officer will provide the Chief Scientist with a log of all calls made from the ship by the scientific party at the completion of the project.

13.0 APPENDICES

(A) List of Coordinates for tracklines or stations.

Exact transects have not yet been established. Part of the first mission will be devoted to establishing permanent transects.

Tortugas Bank	24°-38'N, 83°-04'W
Riley's Hump	24°-30'N, 83°-07'W
Black Coral Rocks	24°-41.9616'N, 83°-00.1503'W
	24°-41.953' N, 83°-00.140' W
	24°-41.947' N, 83°-00.122' W
Wilkes Barre	Loran Tds 13951.5,43573.8 (bow), 13951.4,43574.0 (stern), 24°-27.94'N, 81°-32.34'W
Ocean Freeze	25°-23.086'N, 80°-07.098'W
Adolphus Busch	24°-31.841'N, 81°-27.688'W
Duane	24°-59.28'N, 80°-22.83'W
Conch Reef	24°-56.92'N, 80°-27.43'W
Tennessee Reef	24°-46.00'N, 80°-44.00'W
Carysfort Reef	25°-13.30'N, 80°-13.78'W
Buoy	25°-13.220'N, 80°-12.569'W
Transect beginning	25°-13.096'N, 80°-12.064'W
	25°-13.098'N, 80°-13.054'W
	25°-13.097'N, 80°-13.052'W
	25°-13.122'N, 80°-13.051'W
	25°-13.162'N, 80°-13.037'W
	25°-13.201'N, 80°-13.020'W
	25°-13.240'N, 80°-13.997'W
	25°-13.288'N, 80°-13.984'W
Transect end	25°-13.314'N, 80°-13.969'W
Carysfort Hump	25°-12.006'N, 80°-12.961'W
Elbow Reef	25°-08.66'N, 80°-15.47'W
Looe Key	24°-32.5'N, 81°-24.7'W, 45 ft.
Sand Key Bar	24°-26.82'N, 83°-53.31'W, 23-80 ft.
Sherwood Forest	24°-42.519'N, 82°-02.813'W
Loggerhead Forest (DTNP)	24°-40.045'N, 82°-55.580'W
Eight Fathom Rocks	24°-41.98'N, 82°-59.920'W

(B) Chartlets - overlays, GIS - will be supplied with hardcopy

(C) Emergency Contact phone number - FMP 1-800-342-5367 (1-800- DIAL FMP)
or FKNMS 305-852-7717

(D) Shuttle Schedule - Vessel name, where, when

LEG I

R/V Dante Fascell in Tortugas 8/15-8/21 for scientific support, shuttle, and berthing

R/V Cool Hand in Tortugas 8/15-8/21 and Keys 8/23-27 for scientific support, shuttle, and berthing

FKNMS Shuttle Vessels, Tortugas, August 17, Media Day - shuttle Cheva, media, Laura Francis, Andrea McCurdy, and technician to Ferrel at Sherwood Forest - must arrive by 0745, shuttle media and Cheva back at 1600

FKNMS Shuttle Vessel, Tortugas, August 19, 0800 - shuttle Erich Mueller to Ferrel at Riley's Hump to arrive no later than 0745, shuttle Laddie Akins to Cool Hand, shuttle Gene Hawkridge to Dante Fascell
1600 - shuttle Pam Hallock Muller and crew back to Key West

FKNMS Shuttle Vessel, Key West - August 20 1600 - shuttle Laddie Akins, Paula Coble, and Walt Jaap to Key West from Ferrel

LEG II

FKNMS Shuttle Vessel, Key Largo- August 24 AM -shuttle Mike Brill to FERREL by 0745 1600 - shuttle Brill back to Key Largo

FKNMS Shuttle Vessel, Key Largo- August 25 AM -shuttle Mike Brill and Laddie Akins to FERREL by 0730 1730 - drop off Ogden at Ferrel and take Dustan, Brill, and Akins back to Key Largo

(E) Berthing Schedule:

Assumption: The FKNMS will be getting three berths on the Ferrel for the P.I.s and Mission Coordinator

Ferrel:

8/15-8/18 Pamela Hallock-Muller, Walt Jaap, Dave Savage

8/19-8/21 Erich Mueller, Mary Tagliareni, Dave Savage

8/23-8/24 Mary Tagliareni, Phil Dustan, Dave Savage

8/25-8/27 John Ogden, Mary Tagliareni, Dave Savage

Dante Fascell:

8/15-8/21 Steve Baumgartner, Devon Eggett, Maria Eggett, Laura Francis, Paula Coble (8/15-8/20), John Halas, Kip Evans, John Nazarro, Billy Causey (8/15-8/21), Ben Haskell (8/15-8/18)

Cool Hand:

8/15-8/21 Bill Valley, David Lott, Mary Tagliareni (8/15 - 8/18),Laddie Akins (8/19-8/20),
Bill Goodwin
8/23-8/28 Bill Valley, Mike Brill, Ben Haskell, Phil Dustan (8/25-8/27)

Loggerhead Key Big House:

8/14 - 8/21 Jenny Wheaton (8/14-8/17), Matt Patterson (8/14-8/20), David Eaken (8/14-
8/20), John Dotton (8/14-8/20), Matt Lybolt (8/14-8/20), Andrea McCurdy (NASA)
(8/18-8/21), NASA technician (8/18-8/21), Gene Hawkrige (8/19-8/21), David Mallinson
(8/15-8/21), Dana Williams (8/15-8/19), Gale Graf-Meade (8/15-8/21)

Nichola s Prahl
Rear Admiral, NOAA
Director, Pacific and Atlantic
Marine Centers

Date

LCDR Dave Savage
Mission Coordinator
FKNMS

Date